EXHIBIT D

DR. JONATHAN PUTNAM

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

TQ DELTA, LLC,

PLAINTIFF,

VS. CIVIL ACTION NUMBER 2:21-CV-310

COMMSCOPE HOLDING COMPANY, INC.; COMMSCOPE INC.; ARRIS INTERNATIONAL LIMITED; ARRIS GLOBAL LTD.; ARRIS US HOLDINGS, INC.; ARRIS SOLUTIONS, INC.; ARRIS TECHNOLOGY, INC.; AND ARRIS ENTERPRISES, LLC,

DEFENDANTS.

DEPONENT: DR. JONATHAN PUTNAM

TAKEN: DECEMBER 6, 2022

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JOB NUMBER 220199

DR. JONATHAN PUTNAM

I N D E X

E X H I B I T S

DR. JONATHAN PUTNAM

THE VIDEOTAPED DEPOSITION OF DR. JONATHAN PUTNAM, TAKEN PURSUANT TO NOTICE HERETOFORE FILED, VIA ZOOM VIDEOCONFERENCE, ON DECEMBER 6, 2022, AT APPROXIMATELY 9:32 A.M., UPON ORAL EXAMINATION, AND TO BE USED IN ACCORDANCE WITH THE FEDERAL RULES OF CIVIL PROCEDURE.

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APPEARANCES

VIA ZOOM VIDEOCONFERENCE

FOR THE PLAINTIFF:
EDWARD CHIN, ESQ.
DAVIS FIRM P.C.
111 West Tyler Street
LONGVIEW, TEXAS 75601

FOR THE DEFENDANTS:
LANA SHIFERMAN, ESQ.
GOODWIN PROCTER LLP
100 NORTHERN AVENUE
BOSTON, MASSACHUSETTS 02210

ALSO PRESENT:
AWO BOS, COMPETITION DYNAMICS
DAVID KLEIN, APPLIED ECONOMICS
EMILY WILKINSON, WINSTON
DANIELLE WILLIAMS, WINSTON
DAVID WOODFORD, VIDEOGRAPHER

DR. JONATHAN PUTNAM

THE VIDEOGRAPHER: Good morning, Counselors. My name is David Woodford, legal video specialist in association with TSG Reporting, Inc. Because this is a remote deposition, I will not be in the same room with the witness; instead, I will record this videotaped deposition remotely. The court reporter, Dannielle Copeland, will also not be in the same room and will swear the witness remotely.

Do all parties stipulate to the validity of this video recording and remote swearing and that it will be admissible in the courtroom as if it had been taken following Rule 30 of the Federal Rules of Civil Procedure and the state's rules where this case is pending?

MS. SHIFERMAN: Yes.

MR. CHIN: Yes, for TQ Delta.

THE VIDEOGRAPHER: Thank you.

This is Media Unit Number 1 of the video-recorded deposition of Jonathan Putnam. This is in the matter of TQ Delta, LLC, versus CommScope Holding Company, Inc., et al. It's

being heard before the United States District Court for the Eastern District of Texas, Marshall Division. The Civil Action Number is 2:21-CV-310.

This deposition is taking place remotely on December 6th, 2022, beginning at 9:32 a.m.

Again, my name is David Woodford, legal video specialist; and the court reporter is Dannielle Copeland, both here on behalf of TSG Reporting, Inc.

Will counsel present please introduce yourselves and your affiliations, and the witness will be sworn.

MS. SHIFERMAN: Lana Shiferman with Goodwin Procter on behalf of the CommScope entities. With me are Danielle Williams and Emily Wilkinson from Winston, and David Klein from Applied Economics.

MR. CHIN: Edward Chin of the Davis Firm representing TQ Delta and the witness, and with me is Awo Bos. She's with the witness's firm, Competition Dynamics.

DR. JONATHAN PUTNAM

DR. JONATHAN PUTNAM, CALLED AS A WITNESS HEREIN, HAVING BEEN FIRST DULY AFFIRMED ON OATH, WAS EXAMINED AND TESTIFIED AS FOLLOWS:

EXAMINATION

BY MS. SHIFERMAN:

Q. Good morning, Dr. Putnam.

A. Good morning, Ms. Shiferman.

Q. Can you please state your full name for the record?

A. Jonathan Douglas Putnam.

Q. And please state your address for the record.

A. Home or business?

Q. Your home address.

A. [redacted]

[redacted]

Q. Who are you employed by?

A. Competition Dynamics, Incorporated.

Q. Has your position at Competition Dynamics changed since January 2019?

A. No.

Q. Do you have any documents with you

Q. Does -- so you said an ITC investigation doesn't require an allocation of value among the individual portfolio members.

Does a district court case require an allocation of the value among the individual portfolio members?

A. Well, it depends on the methodology. Not in my case, of course, and not based on the methodology that I developed, it doesn't.

Q. So you're looking at this from your own methodology and not any case law requirement?

A. Well, I don't -- in other words, if -- if your question -- I mean, formally speaking, if you're asking me what the case law requires, that's a legal question; and I'll decline to answer it.

If you're saying as an economist do I understand that sometimes one should look at the value of the other members of the portfolio that aren't asserted in a case, and the answer is: Sometimes that's logically necessary, but it's not legally required, as far as I

understand.

Q. All right. Well, you just said you didn't -- it wasn't required in an ITC case, and I just want to understand why you say it wasn't inquire -- required in an ITC case.

Is it that ITC case, or ITC cases generally?

A. Well, as I said, I'm not trying to make any pronouncement about the law at all.

So it's not -- the point is not that the ITC doesn't require allocation of portfolios.

The point is to answer a question that the ITC may consider relevant, such as was an offer F/RAND, one may need -- and in my case did not need -- to determine the value of other portfolio members. In the same way, in district court, to compute damages, one may need but one may not necessarily compute the value of other portfolio members.

So there's no general legal rule, as far as I know, and -- and that's because the answer depends on what's the question being asked and how is the expert going about trying to answer it.

percent, and the others or worth nothing; or it could be that two of the patents in the portfolio are each worth 10 percent, and both are worth 10 percent together, and the others are worth nothing; so there's, you know, a variety of fact patterns that -- or it could be that one patent is worth 8 percent, and the other is worth 2 percent, and the others are worth nothing.

There's all kinds of possible fact patterns that could arise.

Q. But if you're negotiating a license to a subset of patents in that portfolio, do you need to know the value of what those patents are, whether -- be it high or low?

Do you need to value those -- that subset of patents that are going to be the subject of the license?

A. Well, as I've said -- and again, without trying to pronounce on the law, if you're relying on a portfolio license to determine the value of individual patents, then you need to make adjustments for all the relevant differences between the portfolio

license and the hypothetical license between the parties.

That would include whether the license products are the same. It would include whether things have changed in the interval between the negotiation dates of the two agreements. It would include the fact that licenses, in general, are negotiated absent the assumption of a validity and infringement; whereas, in our negotiation, that's not true.

So all these things are adjustments that should be made based on the facts.

Q. Now, earlier you said that there were sometimes -- sometimes the fact that some patents in a portfolio are invalidated matters; sometimes it doesn't.

Give me some examples of when it matters that some patents in a portfolio are invalidated.

A. Well, I mean, let's just take a hypothetical example.

There's two patents in a portfolio. Everybody agrees that each one of them commands a 5 percent royalty rate independently of the

different times, and so the 33 cents didn't apply before the second patent issued, which was the correction.

Q. Putting aside the timing issue, did dropping one of the asserted patents from Family 10 impact your calculation of the rate for Family 10?

A. No, because of the analysis of --

MR. CHIN: Form.

THE WITNESS: I'm sorry.

MR. CHIN: Yeah.

Objection, form.

THE WITNESS: The analysis is conducted at a -- for the reasons we discussed previously at the level of the individual family. The royalties are collected on a family basis.

BY MS. SHIFERMAN:

Q. Does it matter in your analysis whether all of the patents in Family 10 are valid?

A. No. What matters is that one of them is valid and infringed because that one provides the exclusive power or scope of the

Q. That's higher than the max rate that you discussed, right?

A. Yeah. I think that has to do with whether you're doubling G.bond? or not.

Q. Okay. Well, when we calculated [redacted] right?

So [redacted]

A. Oh, the different -- I'm sorry. Right. Okay.

So I think the source of confusion is that there are five families, four of which are essential to VDSL2, and one of which is practiced by VDSL2 but is not essential.

So if you look at -- [redacted]

Q. So under that assumption, your max rate's [redacted]

A. Well, that's -- one is for SEPs, and one is for the patents asserted in this

MR. CHIN: Objection, form.

THE WITNESS: I'm not sure what that means.

BY MS. SHIFERMAN:

Q. Did you compare the value that a VD- -- VDSL brings, as opposed to, for example, G.bond?

MR. CHIN: Objection, form.

THE WITNESS: I don't -- I'm not aware of any way of computing that reliably, A, at all; B, in a nondiscriminatory fashion; or C, as of 2004, which is the -- for my purposes, the date when one should value DSL technology.

So I don't -- maybe somebody thinks that there is a, quote/unquote, "relative value of the standard"; but I have no idea what that means, particularly because the standards are also practiced together. You can't just practice G.bond? in isolation.

So I think you would have to be talking about some kind of incremental value of one standard over another, and I know of no way to measure that reliably; and I don't know of anybody else has either.

negotiation occurs.

Now, in your report, you say the time doesn't matter; is that right?

A. Okay. So that actual --

MR. CHIN: Objection, form.

THE WITNESS: Sorry.

That's actually an important objection.

I did not say that the hypothetical occurred -- negotiation occurs in 2004. So let's just be clear about that.

I said that was the relevant vantage point for valuing the technology.

BY MS. SHIFERMAN:

Q. Okay. So --

A. With that proviso --

Q. Sorry. Go ahead.

A. Yeah. Well, with that proviso, I think you should probably -- you should probably re-ask your question.

Q. How does the -- how does the fact that 2004 is the relevant vantage point for valuing the technology compare to your opinion that for purposes of the hypothetical

negotiation date in this case, it, you know, doesn't matter when that date is?

MR. CHIN: Objection to form.

THE WITNESS: Well, I mean, I think it compares in the sense that you're trying to determine from the point of view of the -- well, I'll just back up.

TQ Delta has a portfolio of patents, and one of the questions that's at issue is has TQ Delta upheld its RAND commitment in offering to license that portfolio.

That portfolio comprises patents that are alleged to be essential to ADSL, VDSL, and subsequent standards. So for that reason you would look at the world from the point of view of the first of those standards, which is approximately 2004, and you would develop a portfolio licensing program based on that, based on the way the world looked at that date.

That licensing program must be nondiscriminatory; so if any particular licensee doesn't need a license until 2008, that doesn't affect the analysis because you

can't discriminate with respect to that licensee. If you could, then you might take advantage of the fact that the licensee's alternatives appear to be worse in 2008 than they are in 2004, and you would use that to charge a higher rate, because the technology you're licensing is even more valuable than you thought it would be in 2004; but of course, that would be discriminatory, if you did that.

So you can negotiate in 2008, but you need to adopt the terms that you would have set in 2004 for F/RAND purposes.

Now, for -- for damages purposes, you also look at the perspective from 2004 and you ask: What's the value of the technology, not just how was it offered. And the value of the technology in 2004 is higher than the rate card that TQ Delta set for it or would have set for it or Aware would have set for it if they would have been setting a rate card in 2004.

BY MS. SHIFERMAN:

Q. And why is that?

A. Why is?

Q. Why is it higher?

A. -- is the technology more valuable?

Q. You said the rate would be higher. I want -- I want to understand why?

A. Well, for several reasons.

One of them is: Again, in litigation, you've removed the uncertainty surrounding the infringement and validity and essentiality of the patents; so that's a critical difference.

And then as a factual matter, it turns out the technology is more valuable than the rate that TQ Delta assigned to it when it developed its rate card, which, of course, was long after 2004. But what that tells you is that if TQ Delta or Aware had adopted that rate card in 2004 for licensing end-product manufacturers like and CommScope, that offer would have been reasonable because the rates they requested were much less than the value of the technology they were licensing.

Q. As part of the hypothetical negotiation, though, you need to assume, based on the Book of Wisdom, the layer of knowledge that's required related to the value of DSL technology; isn't that true?

I've done the same thing. The numbers are different because the Courts ordered the cases to be litigated differently.

BY MS. SHIFERMAN:

Q. And you confirm that in Paragraph 17 of your report. You say, "The methods I've developed in Delaware, however, apply to TQ Delta's entire patent portfolio; and thus, I apply them here," correct?

A. Well, yeah. And again, by "entire patent portfolio," what I mean by that is including different members of the same families, which are valued in the same fashion. It doesn't mean that there is value that I've assigned to nonasserted patents or families that somehow has been imported into this case. That's not true at all.

Q. But the methods that you developed in 2Wire are the same methods you're using in this case?

A. That is true.

MR. CHIN: Objection, form.

BY MS. SHIFERMAN:

Q. You provided testimony in the 2Wire

case explaining -- or answering questions regarding your methodology.

That testimony remains accurate?

A. Well, I mean, I would put it this way: I'm not aware of anything that I would say differently.

That being said, one can always improve the way one expresses oneself; and there are many facts that have changed since that time.

In addition -- so those are two -- two of the most important are there are additional licenses that have been negotiated by TQ Delta, and we've been able to compute the cost of hold-out.

So -- but I -- as I sit here, I can't think of anything that I would say differently; although, if you pointed me to a particular remark, I might change my mind.

Q. Okay.

MS. SHIFERMAN: It is just -- almost 1:00. Is now a good time -- I'm going to take a break now, but do you want to break for lunch; or do you want to -- we can talk about that off the record?

saves the customer money, and that creates value for the customer, which is reflected in the customer's willingness to pay. That's what a demand curve comes from, is the customer's willingness to pay for the product that is being purchased.

In the same way that when I -- when Apple sells me an iPhone, it is taking into account the value that it creates to me when choosing the price of the iPhone or any other product.

That's the demand side; and then the supply side is Apple's doing that in competition with Samsung; and CommScope's doing that in competition with Nokia. They're both providing products that save their customers costs, and so the price that results is the customer's willingness to pay and the supplier's competition for the customer's business. That's what supply and demand is.

Q. And at -- all right.

So then you -- you have $136 in cost savings per unit of DSL, and you split that 50/50 between the innovator and the implementer; is that right?

A. No. I split that 50/50 between innovators as a class and implementers as a class because both innovators and implementers come together to create standards, and they do that because they both gain for that.

So then the question is: How are the -- now -- now that we've calculated how much the gains are, how should they be divided between all implementers and all innovators. So it is very important to say that it is not an innovator -- innovator and an implementer that are dividing the gains 50/50. It is all innovators and all implementers that are dividing the gains because the standardization is supposed to be fair to both groups, which in this case means that they gain equally or -- and I've given alternative calculations in which they don't gain equally.

But in general, and as I've explained in my report, fairness is an important consideration; and when people are told to be fair, particularly in groups, they divide things equally.

Q. All right. Let me just restate my

question, make sure I have this right.

You took the $136 in cost savings per unit of DSL equipment, and you split that in half by the class of innovators and the class of implementers; is that correct?

A. Yes.

Q. And that's the same Step 3 that you utilized in the 2Wire case?

A. Yes.

Q. What's the basis for your 50/50 split up to the -- between the class of innovators and the class of implementers?

A. Well, there's several bases, beginning in paragraph 348.

So economists have observed, both in theory and in fact, that when people bargain over things, they evaluate the gain from the bargain relevant to their outside alternatives; and if they have equal outside alternatives, which means they have equal bargaining power, then they tend to split the surplus 50/50.

That's the implication of self-interested people trying to maximize their own share in competition with somebody else trying to

maximize their share. That's the implication of the NASH there.

Second, both parties -- meaning implementers as a class and innovators as a class -- so parties is the wrong word; they're not parties -- both classes gain from standardization.

Implementers gain because they can sell more products; innovators gain because they can license their technology. In many cases those people are the same people, and so the standard-setting system endows both groups with the right to a fair outcome, whatever that means.

Third, because both groups are members of -- some people are members of both groups, they are induced to be fair to themselves because if they argue for a high rate as a licensor, then they're going to pay high rates as a licensee; and so the system is self-regulating in the sense that a -- a rational licensor would only choose -- would choose a rate that maximizes its total gains, which includes the rates that it pays as a

licensee. So that tempers a licensor's demands and also makes a licensee want to pay more because the licensee may also be a patent owner.

And finally, when you tell people in bargaining situations to be fair, then they often divide surplus equally; so in that case, they are thinking about the welfare of the other person, not just their own.

So the interesting thing about this is that whether you assume people are self-interested and competing for shares or whether you assume that they are other interested and are truly sharing, you get the same empirical implication, which is that people divide the surplus 50/50.

So that's the basis of making that 50/50 assumption that I made, recognizing that there is, in fact, no bargaining going on within a standard development organization; and because there's no -- there's no bargaining going on, there's no market or, you know, alternatives. A lot of the horse training is being done at the level of technology, not at the level of

prices. So you've got to make an assumption about how to distribute the gain between innovators and implementers, and the -- by far, the most obvious and clearest focal point is a 50/50 division, based both on common sense and on formal economics.

Q. One of the reasons you gave was that if people are trying to be fair, they tend to split things 50/50.

What's your basis for that?

A. Well, I would say on page -- or in paragraph 349D, economists study this exact phenomenon. They give people things to divide between the two of them, and they have to come to some kind of bargain; and then they observe what they do.

So for example, you give people -- you give people a cake, and you say, you know, I want you to bargain over how you're going to divide this cake. The only constraint is that nobody gets any cake until you've come to an agreement.

And so one offer under those circumstances would be to say, okay, I want 95 percent of the

cake, and you get 5 percent. And if you don't agree with me, then neither one of us gets any cake. And the person who's getting 5 percent says, fine, I don't want any cake; you're not being fair.

And, you know, there are people -- there are bargains that result in 95 percent/5 percent divisions, but by far the most common division of the cake under those circumstances is that each person gets half. So this is what people do in the real world.

And that's also true, I should say, in other experiments, what -- what's called the cake-cutting algorithm.

So imagine that the rule, instead, is one person gets to divide the cake however they want, but the other person gets to choose the piece. They get to go first. So when you set up the rule that way, the person who is cutting the cake won't choose an unequal division of the cake because the other person who is maximizing his own interests will choose the larger piece; and so the person who cut the cake will get the smaller piece.

So what is -- what is the result when the cake cutter cuts -- she cuts the cake exactly in half because that maximizes the share of the cake that she will get when her counterparty gets to choose first.

So you can explain equal division by selflessness, and you can explain equal division by selfishness. It turns out you still get equal division.

Q. Now, did I understand that part of your reason was the implementer class is sometimes an implementer and other times -- or strike that.

Do I understand that the innovator class is sometimes an innovator and sometimes an implementer; and therefore, that impacts the positions they might take in a split?

A. Well, that's true in standard development organizations in general.

So for example, Siemens and Nokia in the cellular context both sold handsets in the early days; Siemens, you know, much longer ago, and then Nokia exited maybe ten years ago. They were both implementers and innovators.

REPORTER'S CERTIFICATE

I, DANNIELLE COPELAND, RDR, CRR, DO HEREBY CERTIFY THAT THE FOREGOING DEPOSITION OF DR. JONATHAN PUTNAM WAS TAKEN BEFORE ME AT THE TIME AND PLACE AND FOR THE PURPOSE IN THE CAPTION STATED; THAT THE WITNESS WAS FIRST DULY SWORN TO TELL THE TRUTH, THE WHOLE TRUTH, AND NOTHING BUT THE TRUTH; THAT THE DEPOSITION WAS TAKEN BEFORE ME STENOGRAPHICALLY AND AFTERWARDS TRANSCRIBED UNDER MY DIRECTION; THAT THE FOREGOING IS A FULL, TRUE, AND CORRECT TRANSCRIPT OF THE SAID DEPOSITION SO GIVEN; THAT THERE WAS NO REQUEST THAT THE WITNESS READ AND SIGN THE TRANSCRIPT; THAT THE APPEARANCES WERE AS STATED IN THE CAPTION.

I FURTHER CERTIFY THAT I AM NEITHER OF COUNSEL NOR OF KIN TO ANY OF THE PARTIES TO THIS ACTION, AND AM IN NO WAY INTERESTED IN THE OUTCOME OF SAID ACTION.

WITNESS MY SIGNATURE ON DECEMBER 9, 2022. MY COMMISSION EXPIRES SEPTEMBER 28, 2023.

Dannielle Copeland

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